INCH-POUND

NOTE: The document identifier and heading has been changed on this page to reflect that this is a performance specification. There are no other changes to this document. The document identifier on subsequent pages has not been changed, but will be changed the next time this document is revised.

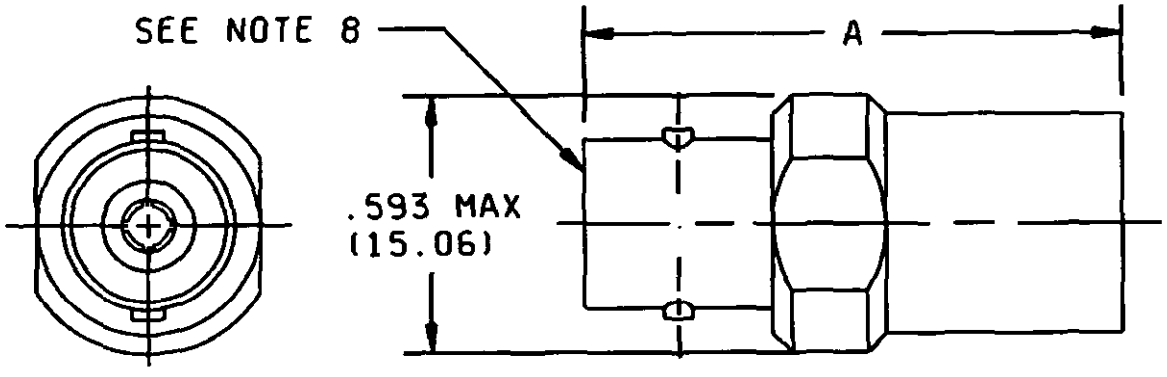
MIL-PRF-39012/17G
26 September 1994
SUPERSEDING
MIL-C-39012/17F
14 December 1987

PERFORMANCE SPECIFICATION SHEET

CONNECTORS, PLUG, ELECTRICAL, COAXIAL, RADIO FREQUENCY, (SERIES BNC, (CABLED), SOCKET CONTACT, CLASS 2)

This specification is approved for use by all Departments and Agencies of the Department of Defense.

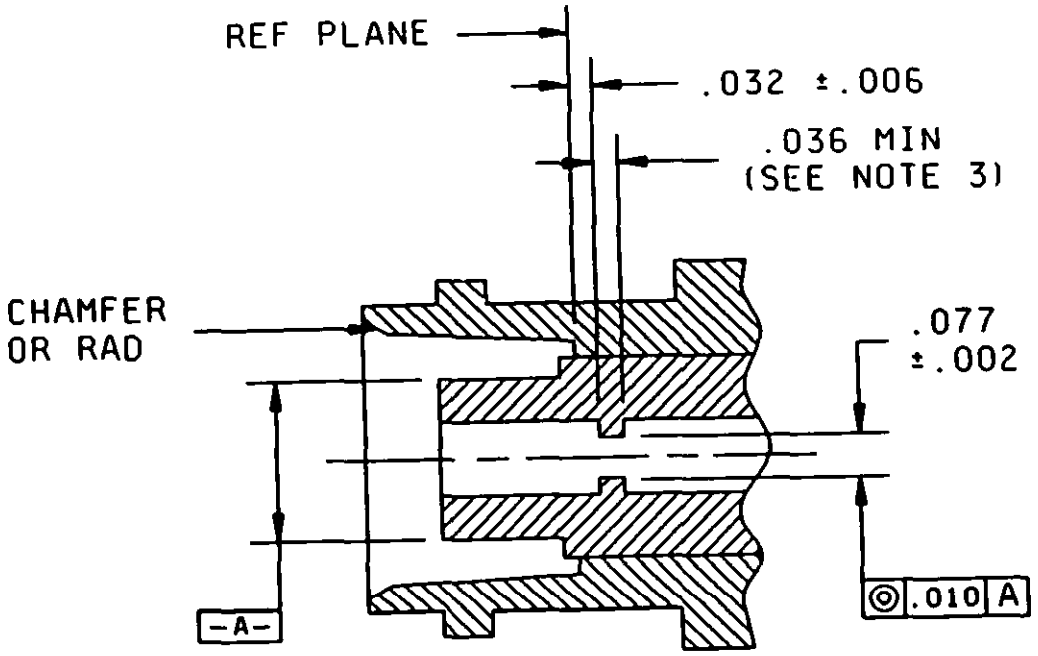
The requirements for acquiring the product described herein shall consist of this specification sheet and the issue of the following specification listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation: MIL-PRF-39012.




NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. For dimension A, see tables I and III.
4. Dimension .593 (15.06 mm) is the largest overall diameter of the connector.
5. Wrench flats (if required for assembly) are to accommodate standard wrench opening in accordance with FED-STD-H28, appendix 10.
6. All undimensioned pictorial representations are for reference purposes only.
7. Dimension A defines the maximum length of the connector when assembled to the appropriate cable.
8. Series BNC, socket contact interface in accordance with MIL-STD-348.

FIGURE 1. General configuration.


DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.




CATEGORY D

| Inches | mm |
|---|---|
| .002 | 0.05 |
| .006 | 0.15 |
| .010 | 0.25 |
| .032 | 0.81 |
| .036 | 0.91 |
| .077 | 1.96 |

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Chamfer is optional.
4. Concave depression .100 (2.54 mm) x .005 (0.13 mm) deep between studs permissible.

FIGURE 2. Mating dimension for socket terminations.

TABLE I. Dash numbers, cross-reference, and dimensions.

| Dash number 1/ | Applicable cable 2/ M17/ | Dimensions | Inches (millimeters) maximum |
|---|---|---|---|
| Category A - Field serviceable (no special tools required) 3/ | | | |
| 0101<br>(Superseding -0111 4/)<br>Cable group VI | 28-RG058<br>155-00001<br>183-00001<br>197-00001<br>111-RG303<br>170-00001<br>60-RG142 5/<br>158-00001<br>84-RG223<br>167-00001<br>194-00001<br>200-00001<br>128-RG400 6/<br>175-00001 | A | 1.250 (31.75) |
| 0102<br>(Superseding -118 4/)<br>Cable group VII | 29-RG59 7/<br>184-00001 7/<br>110-RG302 5/ 6/ 7/<br>30-RG062 7/<br>185-00001 7/<br>97-RG210 7/<br>90-RG71 7/<br>195-00001 7/ | | |
| 0103<br>Cable group IV | 54-RG122 6/<br>157-00001<br>187-00001<br>198-00001 | | |
| 0220<br>Cable group II | 113-RG316 5/ 6/<br>119-RG174<br>173-00001<br>196-00001<br>172-00001<br>94-RG179 7/ | | |
| 0225<br>Cable group X | 74-RG213<br>6-RG11 7/<br>181-00001 7/<br>62-RG144 7/<br>65-RG165<br>159-00001<br>189-00001<br>163-00001<br>75-RG214<br>190-00001<br>164-00001<br>86-00001<br>127-RG393 5/ 6/<br>174-00001<br>77-RG216 7/<br>191-00001 7/ | | |

See footnotes at end of table.

TABLE I. Dash numbers, cross-reference, and dimensions - Continued.

| Dash number 1/ | Applicable cable 2/ M17/ | Dimensions | Inches (millimeters) maximum |
|---|---|---|---|
| Category C - Field replaceable (MIL-C-22520 crimp tool) See footnote next to applicable cable for crimp die 3/ 8/ | | | |
| 0013 Cable group VIA | 28-RG058 9/<br>155-00001 9/<br>183-00001 9/<br>197-00001 9/<br>111-RG303 5/ 6/ 9/<br>170-00001 9/ | A | 1.500 (38.10) |
| 0014 Cable group VIB | 84-RG223 9/<br>60-RG142 5/ 9/<br>158-00001 9/<br>167-00001 9/<br>194-00001 9/<br>200-00001 9/<br>128-RG400 6/ 9/<br>175-00001 9/ | | |
| 0015 (Superseding -0020 4/) Cable group VIIA | 29-RG59 7/ 10/<br>184-00001 7/ 10/<br>110-RG302 5/ 6/ 7/ 10/<br>30-RG062 7/ 10/<br>185-00001 7/ 10/<br>97-RG210 7/ 10/ | | |
| 0016 Cable group IV | 54-RG122 6/ 11/<br>157-00001 11/<br>187-00001 11/<br>198-00001 11/ | | |
| 0017 Cable group VIIB | 90-RG71 6/ 7/ 10/<br>195-00001 7/ 10/ | | |
| 0222 Cable group IIA | 113-RG316 5/ 6/ 12/<br>119-RG174 12/<br>173-00001 12/<br>196-00001 12/<br>172-00001 12/ | | |
| Category D - Field replaceable - Defined piece part 3/ 8/ 13/ 14/ | | | |
| 0501 Cable group IV | 54-RG122 6/<br>157-00001<br>187-00001<br>198-0000 | A | 1.234 (31.34) |
| 0502 Cable group V | 95-RG180 5/ 6/ 7/ | | |
| 0503 Cable group VIB | 60-RG142 5/<br>158-00001<br>84-RG223<br>167-00001<br>194-00001<br>200-00001<br>128-RG400 6/<br>175-00001 | | |
| 0504 Cable group VIA | 28-RG058<br>155-00001<br>183-00001<br>197-00001<br>111-RG303 5/ 6/<br>170-00001 | | |

See footnotes at end of table.

TABLE I. Dash numbers, cross-reference, and dimensions - Continued.

1/ For cross-reference of dash number to superseded PIN or designation, see table IV.

2/ The latest version of each cable shall be applicable.

3/ These connectors have captivated center contacts.

4/ The superseded PIN are acceptable for Government use until stock is purged or 3 years from the date of this specification which ever is earlier.

5/ Cable to be used for the +200°C temperature cycling tests.

6/ Cable to be used when performing test requiring cable except as in 5/ and 7/.

7/ These are not 50-ohm cables; therefore, when attached to the specified connectors, VSWR, RF, leakage and insertion loss are not applicable.

8/ These connectors are assembled using the applicable crimp tool, to the specified cables stripped as shown on figure 4.

9/ M22520/5-19 closure B or M22520/5-05 closure A.
M22520/5-11 closure A.
M22520/5-57 closure A.

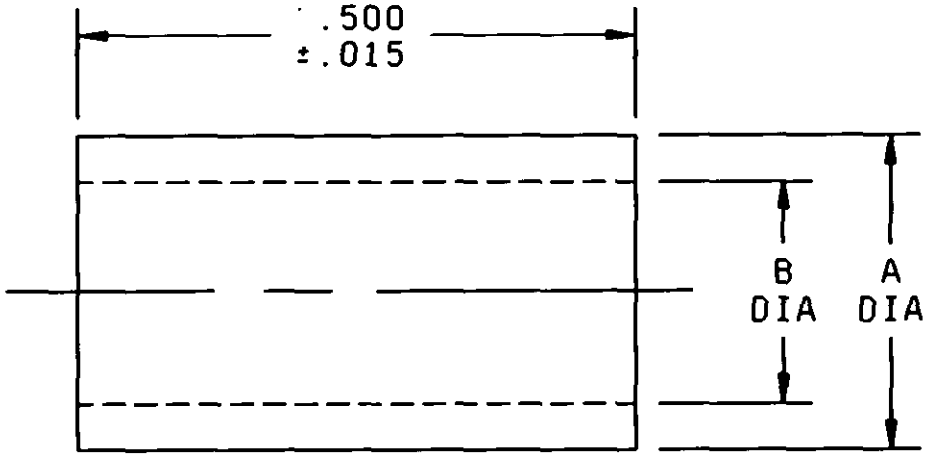
10/ M22520/5-19 closure A or M22520/5-07 closure A.
M22520/5-13 closure A.
M22520/5-59 closure A.

11/ M22520/5-41 closure B or M22520/5-05 closure B.
M22520/5-09 closure A.

12/ M22520/5-35 closure B or M22520/5-03 closure A.

13/ Complete connector assembly shall consist of a body, center contact, ferrule and assembly instructions.

14/ Not to be used in Army equipment.

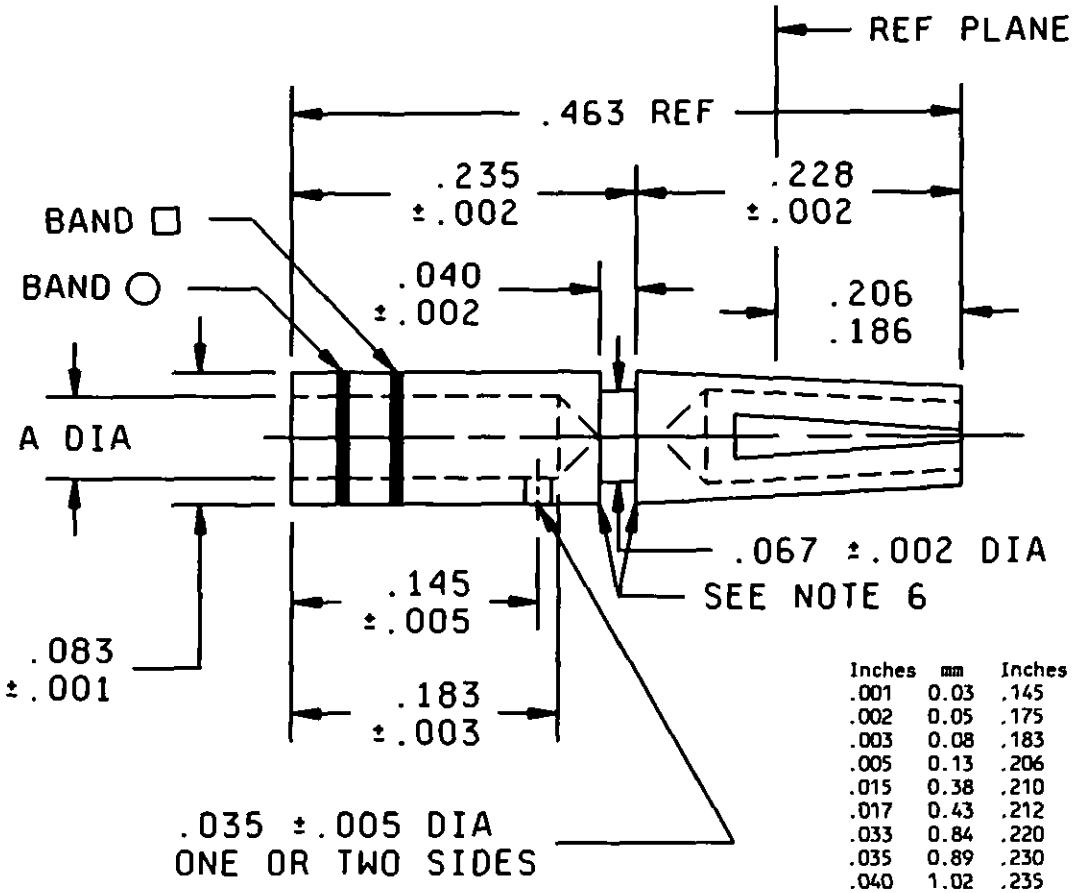



CRIMP FERRULE

| Dash number | Ferrule number 1/ | A ±0.003 | B ±0.003 | Basic crimp tool 2/ | Crimp die or positioner M22520/5 |
|---|---|---|---|---|---|
| 0501<br>0502 | 17-50 | 0.212 | 0.175 | M22520/5-01 | 05, 41 Closure B or 9 Closure A |
| 0503 | 17-51 | 0.250 | 0.220 | | 5, 11, 57 Closure A or 19 Closure B |
| 0504 | 17-52 | 0.245 | 0.206 | | |

1/ Contact numbers and ferrule numbers are for identification only.
2/ Class 2 tool may be used by OEM (see MIL-C-22520).

FIGURE 3. Contact and ferrule dimensions for category D only.



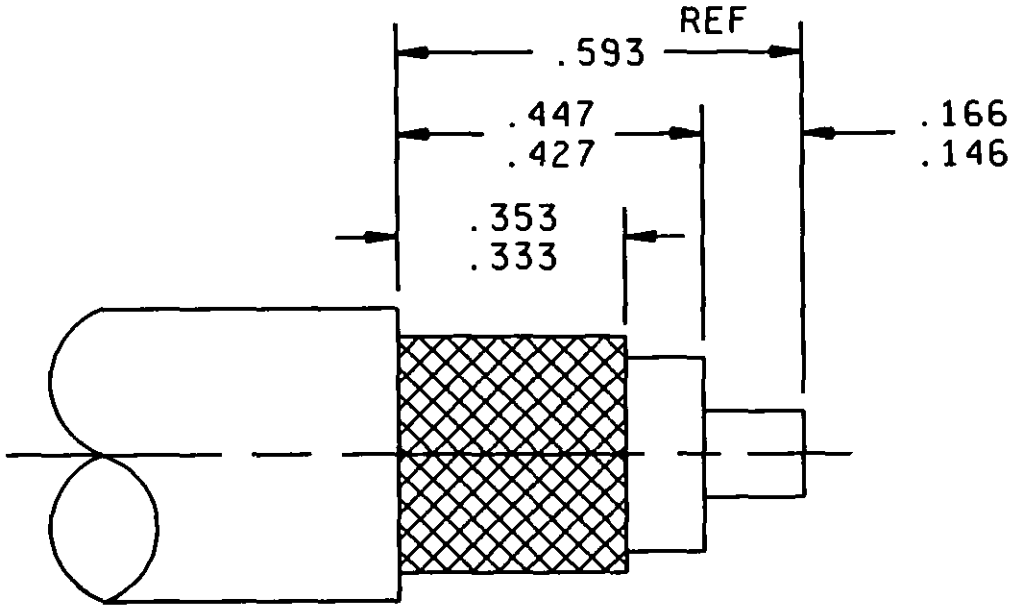

| Inches | mm | Inches | mm |
|---|---|---|---|
| .001 | 0.03 | .145 | 3.68 |
| .002 | 0.05 | .175 | 4.45 |
| .003 | 0.08 | .183 | 4.65 |
| .005 | 0.13 | .206 | 5.23 |
| .015 | 0.38 | .210 | 5.33 |
| .017 | 0.43 | .212 | 5.38 |
| .033 | 0.84 | .220 | 5.59 |
| .035 | 0.89 | .230 | 5.84 |
| .040 | 1.02 | .235 | 5.97 |
| .043 | 1.09 | .250 | 6.35 |
| .067 | 1.70 | .478 | 12.14 |
| .083 | 2.11 | .500 | 12.70 |

| Dash no. | Contact no. 1/ | A +0.001 -0.002 | Basic crimp tool 2/ | Crimp die or positioner | Crimp tensile min | Color band □ | Color band ○ |
|---|---|---|---|---|---|---|---|
| 0501 | 17-12 | 0.033 | M22520/1-01 | M22520/1-12 | 10 lbs | Orn | Green |
| 0502 | 17-11 | 0.017 | | | 6 lbs | Blue | |
| 0503<br>0504 | 17-10 | 0.043 | M22520/1-01 | M22520/1-12 | 20 lbs | Red | |

1/ Contact numbers and ferrule numbers are for identification only.
2/ Class 2 tool may be used by OEM (see MIL-C-22520).

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Contact material shall be phosphor bronze or copper beryllium.
4. Crimp tensile test shall be in accordance with MIL-C-39029.
5. Copyright notice: All information disclosed in these specification sheets which is or may be copyright is reproduced herein with the express permission of the copyright owner.
6. .003 maximum break.
7. Color bands shall be positioned so that no coloring material enters the inspection hole.

FIGURE 3. Contact and ferrule dimensions for category D only - Continued.




| Inches | mm |
|---|---|
| .146 | 3.71 |
| .166 | 4.22 |
| .333 | 8.46 |
| .353 | 8.97 |
| .427 | 10.85 |
| .447 | 11.35 |
| .593 | 15.06 |

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 4. Cable stripping dimensions for field replaceable connectors.

ENGINEERING DATA:

Nominal impedance: 50 ohms.

Frequency range: 0 to 4,000 MHz.

Voltage rating:

500 volts rms, maximum working voltage at sea level.

125 volts rms, maximum at 70,000 feet.

Temperature rating: -65°C to +165°C.

REQUIREMENTS:

Dimensions and configuration: See figure 1 and MIL-STD-348.

Force to engage and disengage:

Longitudinal force - 3 pounds maximum.

Torque - 2-1/2 inch-pounds, maximum.

Coupling proof torque: Not applicable.

Inspection conditions: Coupling torque not applicable.

Mating characteristics:

See MIL-STD-348 and figure 2 for dimensions.

Center contact (socket):

Oversize test pin - .057 diameter minimum (nonclosed entry contacts only).

Insertion depth - .125 minimum.

Number of insertions - 1.

Insertion force test - Steel test pin diameter .054 minimum.

Test pin finish - 16 microinches.

Insertion force - 2 pounds maximum.

Withdrawal force test: Steel test pin diameter .052 maximum.

Withdrawal force - 2 ounces minimum.

Test pin finish - 16 microinches.

Hermetic seal: Not applicable.

Leakage (pressurized connectors): Not applicable.

Insulation resistance: Method 302 of MIL-STD-202, test condition B. 5,000 megohms minimum.

Center contact retention: 6 pounds minimum axial force. Applicable to captivated-center-contact connectors only.

Corrosion (salt spray): Method 101 of MIL-STD-202, test condition B.

Voltage standing wave ratio (VSWR): From 500 to 4,000 MHz, or approximately 80 percent of upper cutoff frequency of the cable, whichever is lower; 1.30 maximum.

Swept frequency VSWR test setup:

Item 6 - VSWR shall be less than 1.015 + .005 F (F in GHz).

Item 16 - VSWR shall be less than 1.015 + .005 F (F in GHz).

Second step of VSWR checkout procedure - VSWR shall be less than 1.045 + .019 F (F in GHz).

Group B inspection - VSWR shall be less than 1.1 + .01 F (F in GHz).

Qualification and group C inspection - VSWR shall not exceed 1.15.

Connector durability: 500 cycles minimum at 12 cycles/minute maximum. The connector shall meet the mating characteristics and force to engage and disengage requirements.

Contact resistance: In milliohms maximum:

| | Initial | After environment |
|---|---|---|
| Center contact | 1.5 | 2.0 |
| Outer contact | .2 | Not applicable |
| Braid to body | .1 | Not applicable |

Dielectric withstanding voltage: Method 301 of MIL-STD-202. 1,500 volts rms minimum at sea level.

Vibration, high frequency: Method 204 of MIL-STD-202, test condition B. No discontinuity permitted.

Shock: Method 213 of MIL-STD-202, test condition G. No discontinuity permitted.

Thermal shock : Method 107 of MIL-STD-202, test condition B, except test high temperature shall be +85°C. High temperature shall be +200°C for connectors using +200°C cables (see tables I and III).

Moisture resistance: Method 106 of MIL-STD-202. No measurements at high humidity. Insulation resistance shall be at least 200 megohms within 5 minutes after removal from humidity.

Corona level:

Voltage - 375 volts rms, minimum.

Altitude - 70,000 feet.

RF high potential withstanding voltage:

Voltage and frequency: 1,000 volts rms at a frequency from 5 to 7.5 MHz.

Leakage current: Not applicable.

Cable retention force:

Noncrimp assemblies: 40 pounds minimum.

Crimp assemblies:

10 pounds minimum for cables .155-.189 OD.

20 pounds minimum for cables .190-.229 OD.

30 pounds minimum for cables .230-.249 OD.

40 pounds minimum for cables .250 OD and larger.

Coupling mechanism retention force: Not applicable.

RF leakage: -55 dB minimum, tested at a frequency between 2 and 3 GHz.

Insertion loss: .2 dB maximum tested at 3 GHz.

Part or Identifying Number (PIN): M39012/17- (dash number from table I or "B" number from table III).

Group qualification: See table II.

TABLE II. Group qualification. 1/

| Group | Submission and qualification of any of the following connectors 2/ | Qualifies the following connectors |
|---|---|---|
| | M39012 | M39012/ |
| I | 17-0101 | 17-0101 |
| | 17-0103 | 17-0102 |
| | 17-0111 | 17-0103 |
| | 17-0118 | 17-0111 |
| | 18-0102 | 17-0118 |
| | 18-0103 | 18-0101 |
| | 18-0111 | 18-0102 |
| | 18-0118 | 18-0103 |
| | 19-0101 | 18-0111 |
| | 19-0110 | 18-0118 |
| | 19-0111 | 19-0101 |
| | 19-0118 | 19-0102 |
| | | 19-0110 |
| | | 19-0111 |
| | | 19-0118 |
| II | 17-0102 | 17-0102 |
| | 18-0101 | 18-0101 |
| | 19-0102 | 19-0102 |
| III | 17B0004 | 17B0004 |
| | 17B0005 | 17B0005 |
| | 17B0006 | 17B0006 |
| | 17B0007 | 17B0007 |
| | 17B0009 | 17B0008 |
| | 17B0019 | 17B0009 |
| | 18B0004 | 17B0012 |
| | 18B0005 | 17B0019 |
| | 18B0006 | 18B0004 |
| | 18B0007 | 18B0005 |
| | 18B0009 | 18B0006 |
| | 18B0019 | 18B0007 |
| | 19B0003 | 18B0008 |
| | 19B0004 | 18B0009 |
| | 19B0005 | 18B0012 |
| | 19B0006 | 18B0019 |

See footnotes at end of table.

TABLE II. Group qualification - Continued. 1/

| Group | Submission and qualification of any of the following connectors 2/ | Qualifies the following connectors |
|---|---|---|
| III | M39012/<br>19B0008<br>19B0019 | M39012/<br>19B0003<br>19B0004<br>19B0005<br>19B0006<br>19B0007<br>19B0008<br>19B0012<br>19B0019 |
| IV | 17B0008<br>17B0012<br>18B0008<br>18B0012<br>19B0007<br>19B0012 | 17B0008<br>17B0012<br>18B0008<br>18B0012<br>19B0007<br>19B0012 |
| V | 17-0013<br>17-0014<br>17-0016<br>17-0020<br>18-0013<br>18-0014<br>18-0016<br>18-0020<br>19-0013<br>19-0014<br>19-0016<br>19-0020 | 17-0013<br>17-0014<br>17-0015<br>17-0016<br>17-0017<br>17-0020<br>18-0013<br>18-0014<br>18-0015<br>18-0016<br>18-0017<br>18-0020<br>19-0013<br>19-0014<br>19-0015<br>19-0016<br>19-0017<br>19-0020 |
| VI | 17-0015<br>17-0017<br>18-0015<br>18-0017<br>19-0015<br>19-0017 | 17-0015<br>17-0017<br>18-0015<br>18-0017<br>19-0015<br>19-0017 |
| VII | 17-0501<br>17-0503<br>17-0504 | 17-0501<br>17-0502<br>17-0503<br>17-0504 |
| VIII | 17-0502 | 17-0502 |

1/ If a connector manufacturer produces a connector which meets all the requirements for two or more connector PIN's (within the same series), the manufacturer may receive qualification approval for two or more connector PIN's qualifying the one connector. It is not necessary that such connectors be in the same group. Each connector, however, must be marked with its own appropriate PIN. For group qualification, the connectors must be of similar design.

2/ For qualification retention, where more than one part is listed in a group in this column, data may be supplied on any of those parts in order to retain qualification for those parts in the corresponding right hand column. The part does not necessarily have to be the part initially qualified.

TABLE III. Category B - Nonfield replaceable (special tools may be required). 1/

Not for Air Force, Army, or Navy use. For OEM use only.

| Dash number 2/ 3/ M39012/17B | Applicable cable M17/ 4/ | Dimensions | Inches (millimeters) maximum |
|---|---|---|---|
| 0004 | 28-RG058 5/ | A | 1.500 (38.10) |
| 0005 | 84-RG223 5/ | | |
| 0006 | 111-RG303 5/ | | |
| 0007 | 60-RG142 5/ 6/ | | |
| 0008 | 29-RG59 5/ 6/<br>30-RG062 6/<br>97-RG210 6/ | | |
| 0009 | 54-RG122 5/ | | |
| 0012 | 90-RG71 5/ 6/ | | |
| 0019 | 110-RG302 5/ 6/ 7/ | | |
| 0221 | 113-RG316 5/ 7/<br>119-RG174 | | |

1/ For maintenance replacements for category B, see table V.

2/ For cross-reference of PIN to superseded PIN or type designation, see table IV.

3/ Inactive for new design.

4/ The latest version of each cable shall be applicable.

5/ Cable to be used when performing tests requiring cable except as in 6/ and 7/.

6/ These are not 50 ohm cables; therefore, when attached to the specified connectors, VSWR, RF leakage, and insertion loss are not applicable.

7/ Cable to be used for the +200°C temperature cycling tests.

TABLE IV. Cross-reference of PIN's.

| Preferred PIN M39012/17 | Substitute for PIN or type designation 1/ 2/ |
|---|---|
| -0101 | UG-89/U, M39012/17-0001 |
| -0102 | UG-261/U, M39012/17-0002 |
| -0103 | UG-1056/U, M39012/17-0003 |
| B0004 | M23329/3-08, M38012/17-0004 |
| B0005 | M23329/3-09, M39012/17-0005 |
| B0006 | M23329/3-10, M39012/17-0006 |
| B0007 | M23329/3-11, M39012/17-0007 |
| B0008 | M23329/3-12, M39012/17-0008 |
| B0009 | M23329/3-13, M39012/17-0009 |
| -0111 | M39012/17-0001 |
| B0012 | M39012/17-0012 |
| -0013 | |
| -0014 | |
| -0015 | |
| -0016 | |
| -0017 | |
| -0118 | |
| B0019 | M39012/17-0019 |
| -0020 | |
| -0501 | |
| -0502 | |
| -0503 | |
| -0504 | |
| B0221 | M39012/17-0221 |

1/ The superseded PIN or the type designation is for cross-reference only. Where a superseded PIN or type designation is not given, none was assigned or will be assigned. The PIN M39012/17-XXXX shall be used in all cases for marking and identifying the connector.

2/ The basic type designation includes all letter versions of the specificed number, e.g. UG-18/U includes UG-18 A/U, UG-18B/U, etc.

TABLE V. Maintenance replacements for category B.

| Category B no. 1/ | Category C dash no. | Category A dash no. | Category D dash no. |
|---|---|---|---|
| B0004 | 0013 | 0101 | 0504 |
| B0005 | 0014 | 0101 | --- |
| B0006 | 0013 | 0111 | --- |
| B0007 | 0014 | 0101 | 0503 |
| B0008 | 0015 | 0102 | --- |
| B0009 | 0016 | 0103 | 0501 |
| B0012 | 0017 | 0102 | --- |
| B0019 | 0020 | 0118 | --- |
| B0221 | 0222 | 0220 | --- |

1/ Category B connectors are for original installation only. They will not be stocked or acquired by the Government.

Revision letters are not used to denote changes due to the extensiveness of the changes.

CONCLUDING MATERIAL

Custodians:
Army - CR
Navy - EC
Air Force - 85
NASA - NA

Review activities:
Army - AT, AV, CR, EA, MI
Navy - AS, MC, OS, SH
Air Force - 11, 19, 99

Preparing activity:
DLA - ES

(Project 5935-3932-07)